

## CLAIMS

What is claimed is:

1. A co-verification interface for design verification systems, comprising:  
an application layer having a plurality of communication connections configured to  
5 communicate with a first system element;  
a network layer in communication with said plurality of communication connections and  
being configured to select a communication connection from said plurality of communication  
connections;  
a data link layer having a communication connection in communication with said  
10 selected communication connection and being configured to communicate with said network  
layer to provide flow control for said communication connection of said data link layer; and  
a physical layer having a communication path in communication with said  
communication connection of said data link layer and being configured to communicate with a  
second system element.
- 15 2. The co-verification interface of claim 1, wherein said application layer is  
configured to couple with said first system element via a standard coupling interface.
3. The co-verification interface of claim 2, wherein said standard coupling interface  
comprises an Application Programming Interface.
4. The co-verification interface of claim 2, wherein said standard coupling interface  
20 comprises a Peripheral Virtual Component Interface.

5. The co-verification interface of claim 2, wherein said standard coupling interface comprises an Open Core Protocol.

6. The co-verification interface of claim 1, wherein said co-verification interface is configured to communicate outgoing communication signals from said first system element to  
5 said second system element.

7. The co-verification interface of claim 1, wherein said co-verification interface is configured to communicate incoming communication signals from said second system element to said first system element.

8. The co-verification interface of claim 1, wherein said application layer is  
10 configured to couple with a virtual system element.

9. The co-verification interface of claim 1, wherein said application layer is configured to open and close each of said plurality of communication connections.

10. The co-verification interface of claim 1, wherein said plurality of communication connections of said application layer is configured to communicate with a plurality of system  
15 elements.

11. The co-verification interface of claim 1, wherein said application layer is segmented into a plurality of application layer segments each including at least one of said plurality of communication connections.

12. The co-verification interface of claim 11, wherein at least two of said application  
20 layer segments support different types of communication signals.

13. The co-verification interface of claim 1, further comprising a standard interface for coupling said data link layer with said physical layer.

14. The co-verification interface of claim 13, wherein said standard interface is disposed substantially between said network layer and said data link layer.

5 15. The co-verification interface of claim 1, wherein:  
said network layer is configured to select at least one communication connection from said plurality of communication connections;  
said data link layer is segmented into a plurality of data link layer segments each having a communication connection in communication with at least one of said at least one  
10 communication connection and being configured to communicate with said network layer to provide flow control for said at least one of said at least one communication connection; and  
said physical layer includes a plurality of communication paths, said communication connection of each of said plurality of data link layer segments each being in communication with one of said plurality of communication paths.

15 16. The co-verification interface of claim 15, wherein at least two of said data link layer segments support different types of communication signals.

17. The co-verification interface of claim 1, wherein said physical layer configured to couple with a physical system element.

18. The co-verification interface of claim 1, wherein said communication path of said  
20 physical layer comprises at least one unidirectional communication path.

19. The co-verification interface of claim 1, wherein said physical layer forms at least one bi-directional communication path comprising a pair of unidirectional communication paths, each being configured to transmit communication signals in opposite directions.

20. The co-verification interface of claim 1, wherein said physical layer is configured  
5 to communicate with said second system element via a second co-verification interface.

21. A co-verification interface for design verification systems, comprising:

a first application layer having a plurality of communication connections configured to communicate with a physical system element;

a first network layer in communication with said plurality of communication connections  
5 of said first application layer and being configured to select a first communication connection from said plurality of communication connections of said first application layer;

a first data link layer having a communication connection in communication with said first communication connection and being configured to communicate with said first network layer to provide flow control for said communication connection of said first data link layer;

10 a physical layer having a communication path in communication with said communication connection of said first data link layer;

a second application layer having a plurality of communication connections configured to communicate with a virtual system element;

a second network layer in communication with said plurality of communication  
15 connections of said second application layer and being configured to select a second communication connection from said plurality of communication connections of said second application layer; and

a second data link layer having a communication connection in communication with said second communication connection and said communication path and being configured to  
20 communicate with said second network layer to provide flow control for said communication connection of said second data link layer.

22. A design verification system, comprising:

a first system element;

a second system element; and

a communication system coupling said first and second system elements, said first system  
5 element being coupled with said communication system and configured to communicate with the  
second system element via a co-verification interface, comprising:

an application layer having a plurality of communication connections configured  
to communicate with said first system element;

10 a network layer in communication with said plurality of communication  
connections and being configured to select a communication connection from said  
plurality of communication connections;

15 a data link layer having a communication connection in communication with said  
selected communication connection and being configured to communicate with said  
network layer to provide flow control for said communication connection of said data  
link layer; and

a physical layer having a communication path in communication with said  
communication connection of said data link layer and being configured to communicate  
with said second system element.

23. The design verification system of claim 22, wherein said second system element is coupled with said communication system and configured to communicate with the first system element via a second co-verification interface, comprising:

a second application layer having a plurality of communication connections configured to  
5 communicate with said second system element;

a second network layer in communication with said plurality of communication connections of said second application layer and being configured to select a second communication connection from said plurality of communication connections of said second application layer; and

10 a second data link layer having a communication connection in communication with said second communication connection and said communication path and being configured to communicate with said second network layer to provide flow control for said communication connection of said second data link layer.

24. The design verification system of claim 22, further comprising a third system element, said first system element being coupled with said communication system and configured to communicate with said third system element via a third co-verification interface, comprising:

5 a third application layer having a plurality of communication connections configured to communicate with said first system element;

a third network layer in communication with said plurality of communication connections of said third application layer and being configured to select a third communication connection from said plurality of communication connections of said third application layer; and

10 a third data link layer having a communication connection in communication with said third communication connection and being configured to communicate with said third network layer to provide flow control for said communication connection of said third data link layer; and

said physical layer having a second communication path in communication with said third communication connection and configured to communicate with said third system element.

15 25. A method for coupling system elements of design verification systems, comprising:

coupling a first system element with a first plurality of communication connections via a first universal coupling interface;

20 configuring said first plurality of communication connections to communicate with said first system element;

selecting at least one communication connection from said first plurality of communication connections;

providing flow control for said at least one communication connection; and

25 transmitting outgoing communication signals from said first system element to a second system element via said at least one communication connection.



26. The method of claim 25, further comprising receiving said outgoing communication signals at said second system element via said at least one communication connection.

27. The method of claim 26, further comprising:

5 coupling said second element with a second plurality of communication connections via a second universal coupling interface;

configuring said second plurality of communication connections to communicate with said second system element;

10 selecting at least one communication connection from said second plurality of communication connections, said at least one communication connection from said second plurality of communication connections being in communication with said at least one communication connection from said first plurality of communication connections; and

receiving said outgoing communication signals at said second system element via said at least one communication connection from said second plurality of communication connections.

15 28. The method of claim 25, further comprising receiving incoming communication signals from said second system element at said first system element via said at least one communication connection.

29. The method of claim 28, further comprising:

coupling said second element with a second plurality of communication connections via a second universal coupling interface;

5 configuring said second plurality of communication connections to communicate with said second system element;

selecting at least one communication connection from said second plurality of communication connections, said at least one communication connection from said second plurality of communication connections being in communication with said at least one communication connection from said first plurality of communication connections; and

10 transmitting said outgoing communication signals from said second system element at said first system element via said at least one communication connection from said first plurality of communication connections.